

# Material Safety Data Sheet

Prepared according to US OSHA, CMA, ANSI and Canadian WHMIS Standards.

## CHLORINE



### Section 1. Chemical product and company identification

<b>Commercial name(s).</b>	: CHLORINE
<b>MSDS no.</b>	20025
<b>Product use</b>	For chemical manufacturing, bleaching, water purification, and other analytical/synthetic chemical uses.
<b>Manufactured/supplied</b>	
<b>Address</b>	2700 Post Oak Drive Houston, TX 77056-8229
<b>Emergency telephone number</b>	CHEMTREC: 1-800-424-9300
<b>Telephone no.</b>	
GENERAL MSDS INFORMATION	1-(713)-896-2896
Fax on Demand	1-(800)-231-1366

### Section 2. Hazards identification

<b>Physical state</b>	: Gas.
<b>OSHA/HCS status</b>	: This material is classified hazardous under OSHA regulations in the United States and the WHMIS Controlled Product Regulation in Canada.
<b>Emergency overview</b>	: DANGER HIGH PRESSURE GAS. MAY BE FATAL IF INHALED. CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. CAN CAUSE TARGET ORGAN DAMAGE. Keep away from heat (<52°C/125°F). Use only with adequate ventilation. Extremely hazardous gas under pressure. Keep cylinder valve closed when the product is not used.
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation.
<b>Potential acute health effects</b>	
<b>Inhalation</b>	: Very toxic by inhalation. Corrosive to the respiratory system.
<b>Skin</b>	: Corrosive to the skin. Causes burns.
<b>Eyes</b>	: Corrosive to eyes. Causes burns.
<b>Ingestion</b>	: Since the product is a gas, it will probably be inhaled rather than ingested. See above. May cause burns to mouth, throat and stomach.
<b>Potential chronic health effects</b>	: CARCINOGENIC EFFECTS: Classified None. by NIOSH. A4 by ACGIH. MUTAGENIC EFFECTS: Not applicable. TERATOGENIC EFFECTS: Not applicable.
<b>Over-exposure signs/symptoms</b>	
<b>Inhalation</b>	Adverse symptoms may include the following: respiratory tract irritation coughing
<b>Ingestion</b>	Adverse symptoms may include the following: stomach pains
<b>Skin</b>	Adverse symptoms may include the following: pain or irritation redness blistering may occur
<b>Eyes</b>	Adverse symptoms may include the following: pain watering redness
<b>Medical conditions aggravated by over-exposure</b>	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

### Section 3. Composition, Information on Ingredients

	CAS number	mole %
<b>Canada</b> Chlorine	7782-50-5	> 99.5

#### United States

Chemical name	CAS #	mole %	Occupational exposure limits	IDLH
Chlorine	7782-50-5	> 99.5	<b>ACGIH TLV (United States, 1/2004).</b> STEL: 2.9 mg/m <sup>3</sup> 15 minute(s). Form: All forms. STEL: 1 ppm 15 minute(s). Form: All forms. TWA: 1.5 mg/m <sup>3</sup> 8 hour(s). Form: All forms. TWA: 0.5 ppm 8 hour(s). Form: All forms. <b>NIOSH REL (United States, 12/2001).</b> CEIL: 1.45 mg/m <sup>3</sup> 15 minute(s). Form: All forms. CEIL: 0.5 ppm 15 minute(s). Form: All forms. <b>OSHA PEL (United States, 8/1997).</b> CEIL: 3 mg/m <sup>3</sup> Form: All forms. CEIL: 1 ppm Form: All forms.	10 ppm

NE: Not Established

C: Ceiling Limit

See Section 16 for possible acronym definitions

See Sections 8, 11, 14 and 15 for details.

### Section 4. First aid measures

Prompt medical attention is mandatory in all cases of overexposure to this gas. Rescue personnel should wear a self-contained breathing apparatus.

- Inhalation** : In case of inhalation, all persons, still conscious, must be brought far from the contaminated area and allowed to breath fresh air. The short time taken for this operation is essential. All unconscious persons must be carried outside from the contaminated area and given mouth-to-mouth resuscitation with a supplementary of oxygen. Others should be treated according to their symptoms and needs. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Get medical attention if symptoms occur.
- Eye contact** : Individual in contact with a gas should not wear contact lenses. Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention immediately.
- Ingestion** : Since the product is a gas, it will probably be inhaled rather than ingested. See above.
- Notes to physician** : Effects of contact or inhalation may be delayed. Provide general supportive measures. Oxygen may be beneficial. The medical doctor must be warned that the person inhaled a very toxic gas.

## Section 5. Fire fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : Decomposition products may include the following materials:  
halogenated compounds
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.
- Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Container explosion may occur under fire conditions or when heated.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

- Personal precautions** : EVACUATE ALL PERSONNEL FROM AFFECTED AREA.  
Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is on cylinder or cylinder valve, contact the closest Air Liquide location.
- Environmental precautions** : In case of a leak, clear the affected area, protect people, eliminate sources of ignition and respond with trained personnel. Adequate fire protection must be provided.
- If leaking incidentally from the cylinder or its valve, contact your supplier. Use non-sparking tools and equipment during the response.
- Methods for cleaning up** : Contact your local Air Liquide Gas supplier for details.

## Section 7. Handling and storage

- Handling** : Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to usage point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow to the cylinder. Do not tamper with (valve) safety device. Close valve after each use and when empty.
- Storage** : Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52°C/125°F. Cylinders must be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no source of ignition in the storage or use area.

## Section 8. Exposure controls/personal protection

- Engineering controls** : Ensure that eyewash stations and safety showers are close to the workstation location. Use only in well-ventilated areas. Gas is heavier than air and will therefore accumulate in low lying areas.
- Personal protection**
- Respiratory** : Use a properly fitted, air-purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Wear leather gloves when handling cylinders of this gas. Otherwise, wear glove protection appropriate to the specific operation for which this gas is used.
- Eyes** : Safety glasses with side shields.

**Skin/Body** : Use body protection appropriate for task. Cotton clothing is recommended for use to prevent static electric build-up. Pressurized product may require use of fire retardant clothing.  
Metal cap, safety shoes are recommended when handling cylinders.



Some applications of this product may require additional or other specific protective clothings. Please consult your supervisor.

**Personal protection in case of a major leak** : Safety glasses with side shields, goggles or face shield. Impervious gloves. Protective clothing. Metal cap, safety shoes. Wear MSHA/NIOSH-approved self-contained breathing apparatus or equivalent and full protective gear.

**Product name Canada**  
Chlorine

**Exposure limits**

**ACGIH TLV (United States, 1/2006).**  
STEL: 2.9 mg/m<sup>3</sup> 15 minute(s).  
TWA: 1.5 mg/m<sup>3</sup> 8 hour(s).

**United States**  
Chlorine

**ACGIH TLV (United States, 1/2006).**  
STEL: 2.9 mg/m<sup>3</sup> 15 minute(s).  
TWA: 1.5 mg/m<sup>3</sup> 8 hour(s).  
**NIOSH REL (United States, 12/2001).**  
CEIL: 1.45 mg/m<sup>3</sup> 15 minute(s).  
**OSHA PEL (United States, 11/2006).**  
CEIL: 3 mg/m<sup>3</sup>

**NE: Not Established**

**Section 9. Physical and chemical properties**

**Physical state** : Gas.  
**Color** : Yellow-green.  
**Odor** : Suffocating.  
**Molecular weight** : 70.9 g/mole  
**Molecular formula** : Cl<sub>2</sub>  
**Boiling/condensation point** : -33.88°C (-29°F)  
**Melting/freezing point** : -101.11°C (-150°F)  
**Critical temperature** : 143.9°C (291°F)  
**Specific gravity** : 1.424 (Air = 1)  
**Vapor density** : 2.4 [Air = 1]  
**Odor threshold** : <1 ppm

**Section 10. Stability and reactivity**

**Stability and reactivity** : The product is stable.  
**Incompatibility with various substances** : Reactive or incompatible with the following materials: reducing materials, combustible materials and organic materials.  
**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.  
**Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

## Section 11. Toxicological information

### Toxicity data

IDLH : 10 ppm

### Acute Effects

**Inhalation** : Very toxic by inhalation. Corrosive to the respiratory system.

**Skin** : Corrosive to the skin. Causes burns.

**Eyes** : Corrosive to eyes. Causes burns.

**Ingestion** : Since the product is a gas, it will probably be inhaled rather than ingested. See above. May cause burns to mouth, throat and stomach.

### Potential chronic health effects

: CARCINOGENIC EFFECTS:  
Classified None. by NIOSH. A4 by ACGIH.  
MUTAGENIC EFFECTS: Not applicable.  
TERATOGENIC EFFECTS: Not applicable.

### Target organs

: Causes damage to the following organs: lungs, upper respiratory tract, skin, eye, lens or cornea.

## Section 12. Ecological information

### Ecotoxicity data

#### Canada / United States

#### Ingredient name

Chlorine

#### Species

Oncorhynchus mykiss (LC50)  
Oncorhynchus mykiss (LC50)  
Oncorhynchus mykiss (LC50)  
Oncorhynchus mykiss (LC50)  
Oncorhynchus mykiss (LC50)  
Oncorhynchus mykiss (LC50)

#### Period

96 hour(s)  
96 hour(s)  
96 hour(s)  
96 hour(s)  
96 hour(s)  
96 hour(s)

#### Result

0.014 mg/l  
0.029 mg/l  
0.132 mg/l  
0.159 mg/l  
0.192 mg/l  
0.291 mg/l

**Products of degradation** : Not applicable.

## Section 13. Disposal considerations

### Disposal

: Residual materials contained in customer-owned cylinders should be disposed of in accordance with Federal, State and Local regulations on waste management. For residual materials contained in cylinders owned by Air Liquide, contact Sales or Customer Service to determine appropriate disposal. Do not return cylinders without authorization from Air Liquide.

## 14 . Transport information

AERG : 124

### Regulatory information

#### Proper shipping name

#### Class

#### UN number

#### PG

#### Label

### UN / IMDG / IATA Classification

CHLORINE

2.3, (8)

UN1017

-



**DOT Classification** CHLORINE. Marine pollutant (Chlorine) 2.3, (8) UN1017 -



**TDG Classification** CHLORINE 2.3, (8) UN1017 -



**Additional information**

**UN**

-

**IMDG**

Marine pollutant

**IATA**

**Passenger and Cargo Aircraft** Quantity limitation: Forbidden  
**Cargo Aircraft Only** Quantity limitation: Forbidden

**DOT**

Marine pollutant  
**Reportable quantity**  
 10 lbs. (4.54 kg)  
**Limited quantity**  
 Yes.

**TDG**

**Special provisions**  
 102

**Packaging instruction**

**Passenger aircraft**  
 Quantity limitation: Forbidden.

**Cargo aircraft**  
 Quantity limitation: Forbidden.

**Special provisions**  
 2, B9, B14, T50, TP19

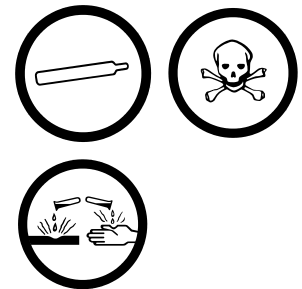
Cylinders should be transported in a secure position, in a well ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards and should be discouraged.

**Section 15. Regulatory information**

**Canada**

**WHMIS (Canada)**

- : Class A: Compressed gas.
- Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
- Class E: Corrosive material



**Canada inventory:** This material is listed or exempted.  
**CEPA Toxic substances:** This material is not listed.  
**Canadian ARET:** This material is not listed.  
**Canadian NPRI:** This material is listed.  
**Alberta Designated Substances:** This material is not listed.  
**Ontario Designated Substances:** This material is not listed.  
**Quebec Designated Substances:** This material is not listed.

**United States**

**OSHA HAZARD COMMUNICATION STANDARD (29CFR PART 1910.1200).**

Compressed gas  
 Highly toxic material  
 Corrosive material  
 Target organ effects

**SARA 313**

	Product name	CAS number	Concentration (%)
<b>Form R - Reporting requirements</b>	: Chlorine	7782-50-5	60 - 100
<b>Supplier notification</b>	: Chlorine	7782-50-5	60 - 100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

**SARA 302/304 emergency planning and notification:** Chlorine

**SARA 311/312 MSDS distribution - chemical inventory - hazard identification:** Chlorine: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard

**CERCLA: Hazardous substances.:** Chlorine: 10 lbs. (4.54 kg)

**US INVENTORY (TSCA)**

TSCA 8(a) CAIR: Chlorine

**United States inventory (TSCA 8b):** This material is listed or exempted.

**State regulations**

**California prop. 65:** No products were found.

**Connecticut Carcinogen Reporting:** This material is not listed.

**Connecticut Hazardous Material Survey:** This material is not listed.

**Florida substances:** This material is not listed.

**Illinois Chemical Safety Act:** This material is not listed.

**Illinois Toxic Substances Disclosure to Employee Act:** This material is not listed.

**Louisiana Reporting:** This material is not listed.

**Louisiana Spill:** This material is not listed.

**Massachusetts Spill:** This material is not listed.

**Massachusetts Substances:** This material is listed.

**Michigan Critical Material:** This material is not listed.

**Minnesota Hazardous Substances:** This material is not listed.

**New Jersey Hazardous Substances:** This material is listed.

**New Jersey Spill:** This material is not listed.

**New Jersey Toxic Catastrophe Prevention Act:** This material is not listed.

**New York Acutely Hazardous Substances:** This material is listed.

**New York Toxic Chemical Release Reporting:** This material is not listed.

**Pennsylvania RTK Hazardous Substances:** This material is listed.

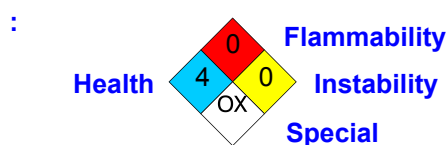
**Rhode Island Hazardous Substances:** This material is not listed.

**Section 16. Other information**

**Hazardous Material Information System (U.S.A.)**

Health	*	4
Fire hazard		0
Reactivity		0
Personal protection		G

**National Fire Protection Association (U.S.A.)**



Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about gas mixtures can be found in pamphlets published by: Compressed Gas Association Inc (CGA), 4221 Walney Road, 5th floor, Chantilly, VA 20151-2923 Telephone: (703) 788-2700.

#### Acronyms

: **ACGIH: American Conference of Governmental Industrial Hygiene.**  
 ACGIH-A4-Not Classifiable as a Human Carcinogen.  
**IARC: International Agency for Research on Cancer.**  
**NIOSH: National Institute of Occupational Safety and Health.**  
 NIOSH: None.  
**OSHA: Occupational Safety and Health Administration**  
**NTP: National Toxicology program.**  
**OECD: Organisation for Economic Co-operation and Development.**  
**PEL: Permissible Exposure Limit.**  
**IDLH: Immediately Dangerous to Life and Health.**  
**NE: Not established.**  
**C: Ceiling Limit.**  
**DSL: Domestic Substance List.**  
**NDSL: Non-Domestic Substance List.**  
**CFR: Code of Federal Regulations.**  
**TSCA: Toxic Substance Control Act.**

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**Date of previous issue** : 06/30/2006

**Version** : 4

#### Notice to reader

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200, American National Standard Institute Z400.1, 2004, the Canadian Workplace Hazardous Material Information Systems (WHMIS). Other government regulations must be reviewed for applicability to this gas mixture. To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.